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Hunting Habits of Wolves Change Ecological Balance in Yellowstone

By JIM ROBBINS

YELLOWSTONE NATIONAL PARK, Wyo. - Hiking along the small, purling Blacktail Deer Creek, Douglas W. Smith, a wolf biologist, makes his way through a lush curtain of willows.

Nearly absent for decades, willows have roared back to life in Yellowstone, and the reason, Mr. Smith believes, is that 10 years after wolves were introduced to Yellowstone, the park is full of them, dispersed across 13 packs.

He says the wolves have changed the park's ecology in many ways; for one, they have scared the elk to high ground and away from browsing on every willow shoot by rivers and streams.

"Wolves have caused a trophic cascade," he said.

"Wolves are at the top of it all here. They change the conditions for everyone else, including willows."

The last 10 years in Yellowstone have re-written the book on wolf biology. Wildlife biologists and ecologists are stunned by the changes they have seen.

It is a rare chance to understand in detail how the effects of an "apex predator" ripple through an ecosystem. Much of what has taken place is recounted in the recently released book "Decade of the Wolf: Returning the Wild to Yellowstone," by Mr. Smith and Gary Ferguson. (Mr. Smith will discuss the effects at 7 tonight in the Linder Theater at the American Museum of Natural History. Admission is \$15.)

In 1995, 14 wolves from Canada were brought into the park by truck and sleigh in the dead of winter, held in a cage for 10 weeks and released. Seventeen were added in 1996. Now, about 130 wolves in 13 packs roam the park.

Yellowstone, says Mr. Smith, is full.

Over the next 10 years, elk numbers dropped considerably. One of the world's largest elk herds, which feeds on rich grasses on the northern range of the park, dropped from 19,000 in 1994 to about 11,000. Wolf reintroduction has been cited as the culprit by hunters, but Mr. Smith says the cause is more complex.

Data recently released after three years of study by the Park Service, the United States Geological Survey and the University of Minnesota found that 53 percent of elk deaths were caused by grizzly bears that eat calves. Just 13 percent were linked to wolves and 11 percent to coyotes. Drought also playing a role. The study is continuing.

Scientists do say that wolf predation has been significant enough to redistribute the elk. That has in turn affected vegetation and a variety of wildlife.

The elk had not seen wolves since the 1920's when they disappeared from the park. Over the last 10 years, as they have been hunted by wolf packs, they have grown more vigilant.

They move more than they used to, and spend most of their time in places that afford a 360-degree view, said Mr. Smith. They do not spend time in places where they do not feel secure - near a rise or a bluff, places that could conceal wolves.

In those places willow thickets, and cottonwoods have bounced back. Aspen stands are also being rejuvenated. Until recently the only cottonwood trees in the park were 70 to 100 years old. Now large numbers of saplings are sprouting.

William Ripple, a professor of botany at Oregon State University, calls the process the "ecology of fear," which has allowed the vegetation to thrive as a result of behavioral changes in the newly skittish and peripatetic elk.

Though the changes now are on a fairly small scale, the effects of the wolves will spread, and in 30 years, according to Mr. Smith, Yellowstone will look very different.

Not everyone is convinced. "Wolves have a role to play," said Robert Crabtree, a canid biologist who has researched wolves and coyotes in the park since the late 1980's. "But the research has ignored climate change and flooding, which have also had an effect on vegetation. Their work isn't wrong, but it's incomplete."

Where willows and cottonwoods have returned, they stabilize the banks of streams and provide shade, which lowers the water temperature and makes the habitat better for trout, resulting in more and bigger fish. Songbirds like the yellow warbler and Lincoln sparrow have increased where new vegetation stands are thriving.

Willow and aspen, food for beaver, have brought them back to the streams and rivers on the northern range. In 1996, there was one beaver dam on the northern range; now there are 10.

The number of wolves has also greatly increased the amount of meat on the ground to the benefit of other species.

Grizzlies and coyotes rarely kill adult elk, but each pack of wolves kills an elk every two or three days. After they eat their fill, other carnivores take over the carcass. Opportunistic scavengers like magpies and ravens make a living on the carcasses.

The number of coyotes, on the other hand, has fallen by half. Numbers of their prey - voles, mice and other rodents - have grown. And that, in turn bolsters the populations of red foxes and the raptors.

The wolves in Yellowstone are not hunted, but they do face hazards. They kill one another in violent encounters between different packs. Fourteen wolves have been killed by cars in the last 10 years, eight of them at Mile Marker 30, on U.S. 191 on the west side of the park.

But the most worrisome threat is posed by the dogs that people bring to the park. The dogs can carry parvovirus, which is the leading cause of death in the wolves over the last year, and it has been killing 60 to 70 percent of the pups.

The wolf population decreased to 130 from 170 in the last year from all causes. Biologists plan to count wolves again this winter and do more testing, and they expect to learn more about the effects of the [virus](#). "I'm a little concerned," Mr. Smith said.

Much is yet to be discovered in the natural laboratory of Yellowstone. "Ten years is not that long a time to measure the effects of wolves," Mr. Smith said. "Their effects are so far reaching and changing that it takes a long time for them to emerge."

